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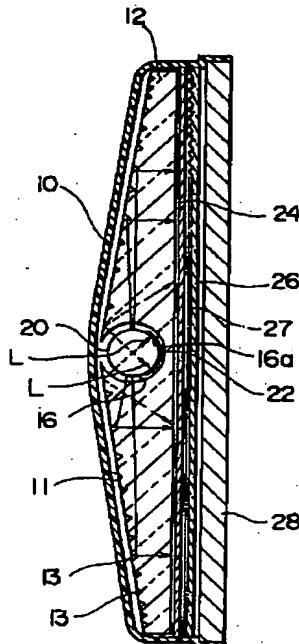
(54)【考案の名称】 照明装置

(57) 【要約】

【目的】 蛍光管の発光を配光上有効に利用することにより、レンズの発光面全体を均一に発光させて視認性の良好な灯具の提供。

【構成】 背面に点刻13の形成された点刻導光板12が容器状の灯具ボディ10内に設けられ、この点刻導光板12の背面には溝16が形成されて、この溝16内に蛍光管20が挿通され、導光板12の前面には、入射光の一部を反射するとともに、略平行な出射光を形成するプリズムレンズ26が設けられ、点刻導光板12に、蛍光管対応領域からの出射光量を低減させるための手段

(光反射膜) 22を設け、蛍光管対応領域だけが周辺領域より明るくなるという光ムラがないようにした。



## 【実用新案登録請求の範囲】

【請求項1】 背面に点刻の形成された点刻導光板が容器状の灯具ボディ内に設けられ、この点刻導光板の背面には溝が形成されて、この溝内に蛍光管が挿通され、導光板の前面には、入射光の一部を反射するとともに、略平行な出射光を形成する角溝状プリズムステップ又は角錐や円錐状プリズム点刻が全面に均一に形成されたプリズムレンズが設けられ、前記点刻導光板には蛍光管対応領域からの出射光量を低減させるための手段が設けられたことを特徴とする照明装置。

【請求項2】 前記出射光量低減手段は、点刻導光板に形成された蛍光管配設用の溝の底面と蛍光管との間に設けられ、蛍光管から溝底面に向かう光を反射する反射面部材であることを特徴とする請求項1記載の照明装置。

【請求項3】 前記出射光量低減手段は、点刻導光板に形成された蛍光管配設用の溝に対応する点刻導光板の表面に一体に形成され又は別部材として設けられ、導光板から前方に出射しようとする光の一部を反射する反射プリズムであることを特徴とする請求項1記載の照明装置。

【請求項4】 背面に点刻の成形された点刻導光板が容器状の灯具ボディ内に設けられ、この点刻導光板の背面には溝が形成されて、この溝内に蛍光管が挿通され、点刻導光板の表面全域には、入射光の一部を反射するとともに、略平行な出射光を形成する角錐や円錐状のプリズム点刻が均一に形成され、前記点刻導光板に形成された蛍光管配設用の溝の底面と蛍光管との間には、蛍光管から溝底面に向かう光を反射する反射面部材が設けられたことを特徴とする照明装置。

## \* 【図面の簡単な説明】

【図1】 本考案の第1の実施例である照明装置の正面図  
【図2】 同照明装置の縦断面図（図1に示す線II-IIに沿う断面図）

【図3】 本考案の第2の実施例である照明装置の要部断面図

【図4】 本考案の第3の実施例である照明装置の要部縦断面図

【図5】 点刻導光板の表面に形成した光量低減手段である反射プリズムの拡大斜視図

【図6】 「SOLF」の光反射作用を説明する説明図

【図7】 本考案の第4の実施例である照明装置の縦断面図

【図8】 プリズム点刻の正面図

【図9】 他のプリズム点刻の正面図

【図10】 従来の照明装置の正面図

【図11】 同装置の縦断面図

## 【符号の説明】

10 灯具ボディ

20 点刻導光板

13 点刻

14 反射プリズム

15 プリズム点刻

16 蛍光管配設用の溝

20 蛍光管

22, 23 光量低減手段である光反射膜

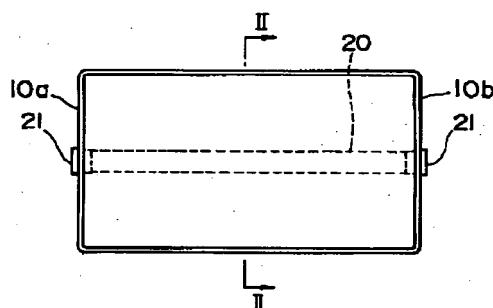
24 光拡散板

26 プリズムレンズ

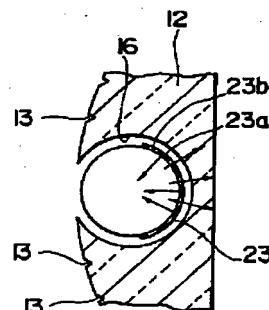
27 プリズムステップ

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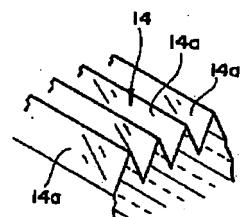
【図1】



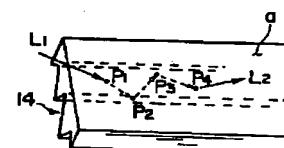
【図3】



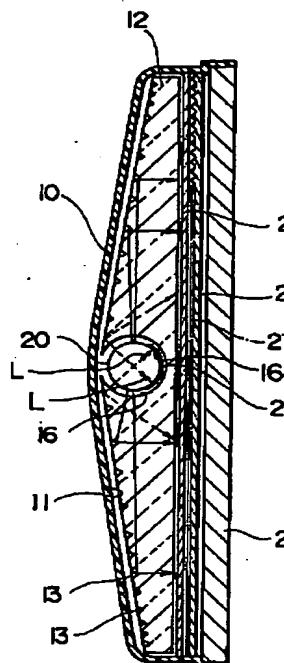
【図5】



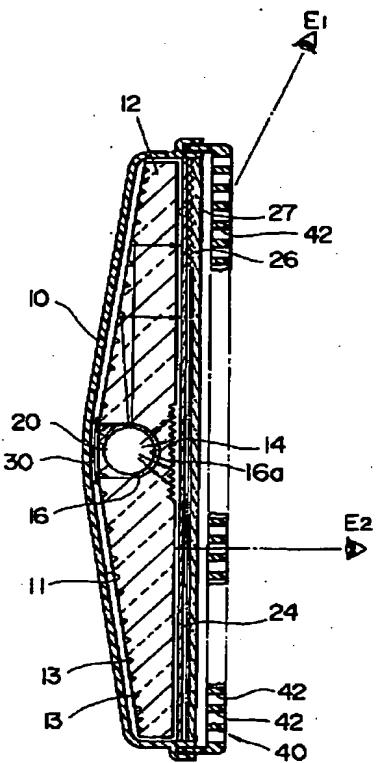
【図6】



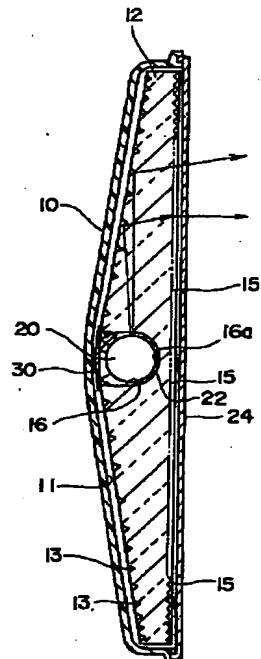
【図2】



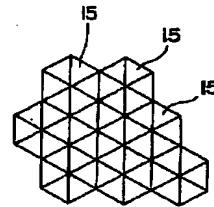
【図4】



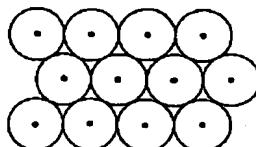
【図7】



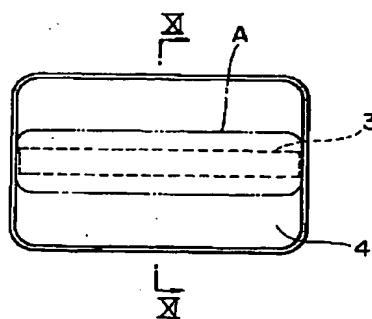
【図8】



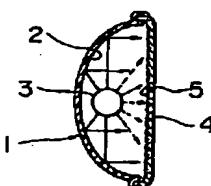
【図9】



【図10】



【図11】



**【考案の詳細な説明】****【0001】****【産業上の利用分野】**

本考案は蛍光管を光源とする照明装置に関する。

**【0002】****【従来の技術】**

従来のこの種の照明装置としては、図10、11に示されるように、内側に放物面形状のリフレクター2が一体に形成された容器状の灯具ボディ1内に蛍光管3が配設され、ボディ1の前面開口部には裏側に拡散ステップ5の形成された拡散レンズ4が組付一体化された構造で、蛍光管3の発光は主としてリフレクター2によって反射されて平行光となり、拡散レンズ4によって拡散光とされて配光される。

**【0003】****【考案の解決しようとする課題】**

しかし、レンズ4にはリフレクター2での反射光の他、図11の破線で示されるように、蛍光管3からの直射光も入射する。しかしこの直射光は拡散ステップ5で制御できないため、適正な配光に寄与する光ではない迷光となり、蛍光のすべてを配光上有効に利用しているといえない。また拡散レンズ4の発光のうち、蛍光管3に対応する領域Aが他の領域に比べて特に明るく発光し、レンズの発光面全体が均一に発光しないため視認性が悪いという問題もあった。

**【0004】**

本考案は前記従来技術の問題点に鑑みなされたもので、その目的は蛍光管の発光を配光上有効に利用するとともに、レンズの発光面全体を均一に発光させて視認性の良好な灯具を提供することにある。

**【0005】****【課題を解決するための手段】**

前記目的を達成するために、請求項1に係る照明装置においては、背面に点刻の形成された点刻導光板が容器状の灯具ボディ内に設けられ、この点刻導光板の背面には溝が形成されて、この溝内に蛍光管が挿通され、導光板の前面には、入

射光の一部を反射するとともに、略平行な出射光を形成する角溝状プリズムステップ又は角錐や円錐状プリズム点刻が全面に均一に形成されたプリズムレンズが設けられ、前記点刻導光板には蛍光管対応領域からの出射光量を低減させるための手段を設けるようにしたものである。

#### 【0006】

また請求項2では、請求項1記載の照明装置において、出射光量低減手段を、点刻導光板に形成された蛍光管配設用の溝の底面と蛍光管との間に設けられ、蛍光管から溝底面に向かう光を反射する反射面部材によって構成するようにしたものである。

また請求項3では、請求項1記載の照明装置において、出射光量低減手段を、点刻導光板に形成された蛍光管配設用の溝に対応する点刻導光板の表面に一体に形成され又は別部材として設けられ、導光板から前方に出射しようとする光の一部を反射する反射プリズムによって構成するようにしたものである。

#### 【0007】

また請求項4では、背面に点刻の成形された点刻導光板が容器状の灯具ボディ内に設けられ、この点刻導光板の背面には溝が形成されて、この溝内に蛍光管が挿通され、点刻導光板の表面全域には、入射光の一部を反射するとともに、略平行な出射光を形成する角錐や円錐状のプリズム点刻が均一に形成され、前記点刻導光板に形成された蛍光管配設用の溝の底面と蛍光管との間には、蛍光管から溝底面に向かう光を反射する反射面部材を設けるようにしたものである。

#### 【0008】

##### 【作用】

請求項1では、蛍光管からの発光は溝の壁面から点刻導光板に入射し、点刻導光板全体に導かれ、導光板背面の点刻で反射されて導光板の前面から拡散光となって出射してプリズムレンズの全面に導かれ、プリズムレンズによって略平行な出射光が形成される。そして点刻導光板に設けられた光量低減手段が導光板の蛍光管対応領域からの出射光量を低減し、蛍光管近傍における光量過多を修正する。

#### 【0009】

請求項2では、蛍光管から導光板の溝底面側に向かう光が、溝底面と蛍光管との間に設けられている光量低減手段である反射面部材によって反射されて、導光板の蛍光管対応領域からの出射光量が低減される。

請求項3では、蛍光管から溝底面を通して導光板に入射した光は、入射後導光板の表面に一体に形成され又は別部材として設けられている反射プリズムによって一部が反射されて、導光板の蛍光管対応領域からの出射光量が低減される。

#### 【0010】

請求項4では、蛍光管からの発光は点刻導光板に入射し点刻導光板全体に導かれ、導光板の表面全体に形成されているプリズム点刻によって略平行光とされて前方に出射する。そして蛍光管から導光板の溝底面側に向かう光が反射面部材によって反射されて、導光板の蛍光管対応領域からの出射光量が低減される。

#### 【0011】

##### 【実施例】

次に、本考案の実施例を図面に基づいて説明する。

図1及び図2は、本考案を大型液晶表示器におけるバック照明装置に適用した実施例を示すもので、図1は比較的大型（例えば縦150mm、横200mm）の液晶表示器の正面図、図2は同表示器の縦断面図（図1に示す線II-IIに沿う断面図）である。

#### 【0012】

これらの図において、符号10は正面観して矩形状で、浅い容器状の灯具ボディである。灯具ボディ10の内側には白色系（銀色を含む）塗装面11が形成されて、光を前方に反射するようになっている。灯具ボディ10内には点刻導光板12が収容配置されるとともに、点刻導光板12の背面側に蛍光管20が配設されている。点刻導光板12は灯具ボディ10の内側に略倣った上下方向中央部程厚肉の矩形状体で、上下方向中央部には背面側に開口し左右に延びる横断面円形の溝16が延設されており、この溝16内には両端部をコネクター21に支持された蛍光管20が挿通配置されている。コネクター21は灯具ボディ10の左右の側壁10a、10bに取着されており、このコネクター21を取り外すことによって蛍光管20の装着脱ができる。

## 【0013】

導光板12の背面には多数の点刻13が形成されており、溝16の壁面から導光板12内に入射した蛍光は導光板内で反射をくり返して導光板の上下の側端部にまで導かれ、導光板の背面に形成されている点刻13によって反射されて導光板の前面から拡散光となって前方に出射する。なお点刻密度は上下の側端部側程密とされて、側端部における光量不足を補うことによって導光板全面からの出射光量の均一化が図られている。

## 【0014】

また蛍光管配設用の溝16の底面16aに臨む蛍光管20の外側面には、光量低減手段であるアルミニウム蒸着やホットスタンプ処理等によって光反射膜22が形成されている。このため蛍光管20の発した光のうち前方に向かう直射光は、図2の符号Lに示されるように、この光反射膜22によって後方に反射され、ランプボディ内側の白色系塗装面11で反射されて再び導光板12内に導かれる。この光反射膜22が形成されていない場合には、導光板12の蛍光管に対応した領域からの出射光量が他の領域より多く、光ムラが生じる傾向があるが、本実施例では、光反射膜22によって蛍光管20に対応する導光板の上下方向中央部領域からの出射光量が低下するためこのようなことがなく、導光板12から出射する光の光量が全面において均一化されている。

## 【0015】

導光板12の前面には、表面しば加工処理され、光を平滑化するための光拡散板24が、さらには裏面にプリズムステップ27が形成され、上下方向に略平行な出射光を形成するプリズムレンズ26が配置され、灯具ボディ10の前面開口部には液晶表示パネル28が組付一体化されている。プリズムレンズ26のプリズムステップ27は、左右方向に延びる角溝が上下方向等ピッチで連続形成された構造で、「SOLF」という反射フィルムの表面に形成されている精密プリズムと同一のステップで、ステップ27に入射する光の入射角の臨界角との大小関係によって光の一部が反射され、光の一部が透過するようになっている。そして導光板12から出射した拡散光は、光拡散板24でさらに拡散され、散乱光となってプリズムレンズ26に導かれる。散乱光のうち入射角が臨界角より小さい光

はプリズムレンズ26を透過して略平行光となるが、入射角が臨界角より大きい光はプリズムステップ27で反射されて導光板12側に戻される。そしてプリズムレンズ26全体から光量の平滑化された平行光が得られ、液晶表示パネル28を照明する。

#### 【0016】

なお前記した実施例では、プリズムレンズ26の蛍光管対応領域における光量低減手段として、光反射膜22を蛍光管20の外側面に形成する構造となっていいるが、他の光量低減手段としては、光反射膜22に代えて光半透過膜やハーフミラーや、図3に示されるような帯状の遮光部23aと透光部23bとが連続する膜23を用いてもよい。

また前記した第1、第2の実施例では、光量低減手段を蛍光管20に一体に形成しているが、溝16の底面16aに直接形成したり、溝16と蛍光管20との間に光反射膜22を形成した部材を介装するようにしてもよい。

#### 【0017】

図4は本考案の第3の他の実施例である照明装置の縦断面図である。

前記第1の実施例は液晶表示器用の照明装置であったが、この第2の実施例は天井や壁等に取付けて使用する照明具に適用したものである。前記第1の実施例と異なる点は、蛍光管20に光反射膜が形成されておらず、蛍光管20から前方に向かう光は反射されることなく、導光板12に入射するようになっており、そして、蛍光管配設用の溝16に対応する導光板の表面に溝底面16aから導光板12に入射した光の一部を反射するための反射プリズム14が設けられ、溝16の開口部側には反射プリズム14で反射された光を積極的に上下方向前方に反射する反射板30が設けられていることである。

#### 【0018】

反射プリズム14は、例えば導光板12を透明なポリカーボネート樹脂製とし、図5に示されるように、導光板12の表面に45度の角溝14aが例えば0.35mmピッチで蛍光管配設方向と平行に連続形成されたもので、図6に示す商品名「SOLF」と呼ばれる反射フィルムに形成されている精密プリズムの溝と同一の溝によって構成されている。この「SOLF」はプリズム形成面において

臨界角の大小により一部の光を透過させて平行光として出射し、一部の光を反射し、プリズム溝の延在方向に対し左右27.6度の傾斜角で平滑面側から入射した光をすべて反射するという性質をもつ。即ち、「SOLF」では、図6に示されるように、光L<sub>1</sub>が平滑面a上のP<sub>1</sub>点からフィルム内に入射し、光はP<sub>2</sub>点においてプリズムの表面で反射する。さらに光はP<sub>3</sub>点においてプリズムの他の表面で反射し、平滑面a上の点P<sub>4</sub>を通って光L<sub>2</sub>としてフィルムから出射する。この「SOLF」のプリズム溝と同様のプリズム溝からなる反射プリズム14では、蛍光管20から溝の底面16aを介し導光板12に入射した光の大半を反射するので、この実施例においても、前記第1の実施例と同様、蛍光管20に対応する上下方向中央の領域だけが明るくなるという光ムラがなくなる。なお溝16の横断面はU字型とされており、導光板12の背面側からの蛍光管20の装着が可能となっている。

#### 【0019】

またプリズムレンズ26の前面には、前記実施例の液晶表示パネル28に代えて、左右に延びる帯状スリット42が上下方向に連続形成された遮光枠40が組付けられている点も相違する。この遮光枠40は、スリット42を透過できる光だけ、即ち遮光枠40の延在方向と略直交する方向に進行する光だけを透過させて、透過光に指向性をもたせているので、E<sub>2</sub>に示すように照明具と正対する正面位置からは蛍光が見えるが、E<sub>1</sub>に示すように照明具に対し上下斜め方向の位置からは光が全く見えない構造となっている。その他は前記第1の実施例と同一であり、同一の符号を付すことによりその説明は省略する。

なお前記第3の実施例では導光板12の表面に一体に反射プリズム14が形成されているが、導光板12上の蛍光管対応位置に反射プリズムの作用をもつ「SOLF」を貼着した構造であってもよい。

#### 【0020】

図7は本考案の第4の実施例である照明装置の縦断面図である。

本実施例では、プリズムレンズを設ける代りに導光板12の表面全域に図8に示されるような六角錐形プリズム点刻15が連続形成されている。このため導光板12内の光は、プリズム点刻15において入射角が臨界角より大きいと反射さ

れ、臨界角より小さいと前方に略平行光となって出射される。前記実施例で示したプリズムステップ27は上下方向に対し出射光を略平行にする作用があるが、出射光を左右方向に対して略平行にする作用はない。しかしこのプリズム点刻15には上下方向及び左右方向に対して出射光を略平行にする作用があるため、左右方向にも平行に調整された光が光拡散板24の発光面全体に導かれる。即ち導光板12の前面に形成されているプリズム点刻15がプリズムレンズとして作用するので、それだけ灯具の構成部品点数が少なく構造が簡潔である。なおプリズム点刻15は、六角錐形の他、円錐形(図9参照)や四角錐形等であってもよい。

#### 【0021】

なお前記した第1~3の実施例におけるプリズムレンズ26に代えて、裏面にプリズム点刻の形成されたプリズム点刻レンズを用いてもよい。

#### 【0022】

##### 【考案の効果】

以上の説明から明らかなように、請求項1に係る照明装置によれば、蛍光管の発光が点刻導光板を介してプリズムレンズ全体を発光させるとともに、点刻導光板に設けられた光量低減手段が導光板の蛍光管対応領域からの出射光量を低減し、蛍光管近傍における光量過多を修正するので、迷光もなくプリズムレンズ全体が均一に発光し、視認性良好な照明装置が得られる。

#### 【0023】

請求項2では、蛍光管から導光板の溝底面側に向かう光が、溝底面と蛍光管との間に設けられている光量低減手段である反射面部材によって反射されて減光されるので、プリズムレンズ全体が均一に発光し、視認性良好な照明装置が得られる。

請求項3では、蛍光管から溝底面を通して導光板に入射した光は、入射後導光板の表面に設けられている反射プリズムによって一部が反射されて減光されるので、プリズムレンズ全体が均一に発光し、視認性良好な照明装置が得られる。

#### 【0024】

請求項4では、蛍光管の発光は裏面に点刻が施され前面にプリズム点刻が施さ

れた点刻導光板全体を発光させるとともに、溝底面と蛍光管との間に設けられている光量低減手段である反射面部材によって蛍光管対応領域からの出射光量が減光されるので、点刻導光板全体が均一に発光し、視認性良好な照明装置が得られる。



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**CLAIMS**

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[Utility model registration claim]

[Claim 1] The stipple light guide plate with which stipple was formed in the tooth back is prepared in the container-like lighting fixture body, a slot is formed in the tooth back of this stipple light guide plate, and fluorescence tubing is inserted in this Mizouchi. In the front face of a light guide plate The prism lens with which the angle groove prism step or pyramid which forms an parallel outgoing radiation light, and cone-like prism stipple were formed in homogeneity on the whole surface is prepared. while reflecting a part of incident light -- abbreviation -- The lighting system characterized by establishing the means for making said stipple light guide plate reduce the outgoing radiation quantity of light from the field corresponding to fluorescence tubing.

[Claim 2] Said outgoing radiation quantity of light reduction means is a lighting system according to claim 1 characterized by being the reflector member which reflects the light which is prepared between the bases of the slot for fluorescence tubing arrangement and fluorescence tubing which were formed in the stipple light guide plate, and goes to a groove bottom side from fluorescence tubing.

[Claim 3] Said outgoing radiation quantity of light reduction means is a lighting system according to claim 1 characterized by being the reflecting prism which reflects a part of light which it is formed in the front face of the stipple light guide plate corresponding to the slot for fluorescence tubing arrangement formed in the stipple light guide plate at one, or is prepared as another member, and is going to carry out outgoing radiation ahead from a light guide plate.

[Claim 4] The stipple light guide plate with which stipple was fabricated by the tooth back is prepared in the container-like lighting fixture body, a slot is formed in the tooth back of this stipple light guide plate, and fluorescence tubing is inserted in this Mizouchi. Throughout the front face of a stipple light guide plate A pyramid and the conic prism stipple which forms an parallel outgoing radiation light are formed in homogeneity. while reflecting a part of incident light -- abbreviation -- The lighting system characterized by preparing the reflector member which reflects the light which goes to a groove bottom side from fluorescence tubing between the bases of the slot for fluorescence tubing arrangement and fluorescence tubing which were formed in said stipple light guide plate.

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[Translation done.]

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## DETAILED DESCRIPTION

[Detailed explanation of a design]

[0001]

[Industrial Application]

This design is related with the lighting system which makes fluorescence tubing the light source.

[0002]

[Description of the Prior Art]

As this conventional kind of a lighting system, as shown in drawing 10 and 11 With the structure where the fluorescence tubing 3 was arranged in the container-like lighting fixture body 1 with which the reflector 2 of a paraboloid configuration was formed inside at one, and the diffusion lens 4 with which the diffusion step 5 was formed in the background was united with front opening of the body 1 with the group It is mainly reflected by the reflector 2 and luminescence of the fluorescence tubing 3 turns into parallel light, and luminous intensity distribution are carried out with the diffusion lens 4, being used as the diffused light.

[0003]

[The technical problem which is going to solve a design]

However, as shown by the broken line of drawing 11 besides the reflected light in a reflector 2, incidence also of the direct solar radiation from the fluorescence tubing 3 is carried out to a lens 4. However, this direct solar radiation turns into the stray light which is not the light which contributes to proper luminous intensity distribution since it is uncontrollable by the diffusion step 5, and it cannot be said that all the fluorescence is used for luminous-intensity-distribution top validity. Moreover, since the field A corresponding to the fluorescence tubing 3 emitted light especially brightly among luminescence of the diffusion lens 4 compared with other fields and the whole luminescence side of a lens did not emit light to homogeneity, the problem of being bad was also visible.

[0004]

This design was made in view of the trouble of said conventional technique, and it is in making the whole luminescence side of a lens emit light to homogeneity, and offering a lighting fixture with good visibility, while the object uses luminescence of fluorescence tubing for luminous-intensity-distribution top validity.

[0005]

[Means for Solving the Problem]

In the lighting system applied to claim 1 in order to attain said object The stipple light guide plate with which stipple was formed in the tooth back is prepared in the container-like lighting fixture body, a slot is formed in the tooth back of this stipple light guide plate, and fluorescence tubing is inserted in this Mizouchi. In the front face of a light guide plate The prism lens with which the angle groove prism step or pyramid which forms an parallel outgoing radiation light, and cone-like prism stipple were formed in homogeneity on the whole surface is prepared. while reflecting a part of incident light -- abbreviation -- The means for reducing the outgoing radiation quantity of light from the field corresponding to fluorescence tubing is formed in said stipple light guide plate.

[0006]

Moreover, it is prepared between the bases of the slot for fluorescence tubing arrangement and fluorescence tubing which were formed in the stipple light guide plate in the outgoing radiation quantity of light reduction means, and is made for the reflector member which reflects the light which goes to a groove bottom side from fluorescence tubing to constitute from claim 2 in a lighting system according to claim 1.

Moreover, it is made for the reflecting prism which reflects a part of light which it is formed in the front face of the stipple light guide plate corresponding to the slot for fluorescence tubing arrangement formed in the stipple light guide plate at one, or is prepared as another member, and is going to carry out outgoing radiation of the outgoing radiation

quantity of light reduction means ahead from a light guide plate to constitute from claim 3 in a lighting system according to claim 1.

[0007]

Moreover, in claim 4, the stipple light guide plate with which stipple was fabricated by the tooth back is prepared in the container-like lighting fixture body. A slot is formed in the tooth back of this stipple light guide plate, and fluorescence tubing is inserted in this Mizouchi. Throughout the front face of a stipple light guide plate A pyramid and the conic prism stipple which forms an parallel outgoing radiation light are formed in homogeneity. while reflecting a part of incident light -- abbreviation -- Between the bases of the slot for fluorescence tubing arrangement and fluorescence tubing which were formed in said stipple light guide plate, the reflector member which reflects the light which goes to a groove bottom side from fluorescence tubing is prepared.

[0008]

[Function]

in claim 1, incidence of the luminescence from fluorescence tubing is carried out to a stipple light guide plate from the wall surface of a slot, and it is led to the whole stipple light guide plate, it is reflected by the stipple on the tooth back of a light guide plate, and it turns into the diffused light from the front face of a light guide plate, carries out outgoing radiation, and is drawn all over a prism lens -- having -- a prism lens -- abbreviation -- an parallel outgoing radiation light is formed. And the quantity of light reduction means formed in the stipple light guide plate reduces the outgoing radiation quantity of light from the field corresponding to fluorescence tubing of a light guide plate, and corrects the excess [ / near the fluorescence tubing ] of the quantity of light.

[0009]

In claim 2, it is reflected by the reflector member whose light which goes to the groove bottom side side of a light guide plate from fluorescence tubing is the quantity of light reduction means established between a groove bottom side and fluorescence tubing, and the outgoing radiation quantity of light from the field corresponding to fluorescence tubing of a light guide plate is reduced.

In claim 3, a part is reflected by the reflecting prism which the light which carried out incidence to the light guide plate through the groove bottom side from fluorescence tubing is formed in the front face of an after [ incidence ] light guide plate at one, or is formed as another member, and the outgoing radiation quantity of light from the field corresponding to fluorescence tubing of a light guide plate is reduced by it.

[0010]

In claim 4, incidence is carried out to a stipple light guide plate, and luminescence from fluorescence tubing is led to the whole stipple light guide plate, it is made abbreviation parallel light by the prism stipple currently formed on the surface of [ whole ] the light guide plate, and carries out outgoing radiation ahead by it. And the light which goes to the groove bottom side side of a light guide plate from fluorescence tubing is reflected by the reflector member, and the outgoing radiation quantity of light from the field corresponding to fluorescence tubing of a light guide plate is reduced.

[0011]

[Example]

Next, the example of this design is explained based on a drawing.

Drawing 1 and drawing 2 show the example which applied this design to the back lighting system in a large-sized liquid crystal display, and the front view of a liquid crystal display [ that drawing 1 is comparatively large-sized (for example, wide / 150mm long, 200mm (wide) / ) and drawing 2 are drawings of longitudinal section (sectional view in alignment with line II-II shown in drawing 1 ) of this drop.

[0012]

In these drawings, front view of the sign 10 is carried out, it is a rectangle-like, and is the lighting fixture body of the shape of a shallow container. Inside the lighting fixture body 10, the white system (silver is included) painted surface 1 is formed, and light is reflected ahead. While hold arrangement of the stipple light guide plate 12 is carried out into the lighting fixture body 10, the fluorescence tubing 20 is arranged in the tooth-back side of the stipple light guide plate 12. The slot 16 of a cross-section round shape where the stipple light guide plate 12 is as heavy-gage a rectangle-like object as the \*\*\*\*\* vertical direction center section, carries out opening in the vertical direction center section inside the lighting fixture body 10 at a tooth-back side, and is prolonged right and left is installed, and insertion arrangement of the fluorescence tubing 20 supported by the connector 21 in both ends is carried out into this slot 16. The connector 21 is attached in the side attachment walls 10a and 10b of right and left of the lighting fixture body 10, and mount/dismount of the fluorescence tubing 20 can be performed by removing this connector 21.

[0013]

Much stipples 13 are formed in the tooth back of a light guide plate 12, and the fluorescence which carried out incidence

into the light guide plate 12 from the wall surface of a slot 16 repeats an echo within a light guide plate, is led even to the side edge section of the upper and lower sides of a light guide plate, it is reflected by the stipple 13 currently formed in the tooth back of a light guide plate, and it turns into the diffused light from the front face of a light guide plate, and carries out outgoing radiation ahead. In addition, it is supposed that a stipple consistency is as dense as an up-and-down side edge section side, and equalization of the outgoing radiation quantity of light from the whole light guide plate surface is attained by compensating the lack of the quantity of light in the side edge section.

[0014]

Moreover, the light reflex film 22 is formed in the lateral surface of the fluorescence tubing 20 which attends base 16a of the slot 16 for fluorescence tubing arrangement of the vacuum plating of aluminium, hot-stamping processing, etc. which are a quantity of light reduction means. For this reason, it is back reflected by this light reflex film 22, it is reflected by the white system painted surface 11 of the lamp body inside, and the direct solar radiation which goes ahead among the light which the fluorescence tubing 20 emitted is again drawn in a light guide plate 12 with it, as shown in the sign L of drawing 2. Although there is more outgoing radiation quantity of light from the field corresponding to fluorescence tubing of a light guide plate 12 than other fields and there is an inclination which optical nonuniformity produces when this light reflex film 22 is not formed, in this example, since the outgoing radiation quantity of light from the vertical direction center-section field of the light guide plate corresponding to the fluorescence tubing 20 falls with the light reflex film 22, there is no such thing, and the quantity of light of the light which carries out outgoing radiation from a light guide plate 12 is equalized on the whole surface.

[0015]

the prism step 27 forms [ the optical diffusion plate 24 for surface crimp processing processing being carried out and graduating light in the front face of a light guide plate 12, ] in a rear face further -- having -- the vertical direction -- abbreviation -- the prism lens 26 which forms an parallel outgoing radiation light is arranged, and the liquid crystal display panel 28 is united with front opening of the lighting fixture body 10 with the group. It is the structure where continuation formation of the \*\*\* prolonged in a longitudinal direction was carried out in pitches, such as the vertical direction, and the prism step 27 of the prism lens 26 is the same step as the precision prism currently formed in the front face of the reflective film "SOLF", with size relation with the critical angle of the incident angle of the light which carries out incidence to step 27, a part of light is reflected and a part of light penetrates it. And the diffused light which carried out outgoing radiation from the light guide plate 12 is further diffused with the optical diffusion plate 24, turns into the scattered light, and is led to the prism lens 26. Although the light with an incident angle smaller than a critical angle penetrates the prism lens 26 and turns into abbreviation parallel light among the scattered lights, it is reflected at the prism step 27 and the light with a larger incident angle than a critical angle is returned to a light guide plate 12 side. And the parallel light by which the quantity of light was graduated is obtained from the prism lens 26 whole, and the liquid crystal display panel 28 is illuminated.

[0016]

In addition, although it has structure which forms the light reflex film 22 in the lateral surface of the fluorescence tubing 20 in the above mentioned example as a quantity of light reduction means in the field corresponding to fluorescence tubing of the prism lens 26, the film 23 with which protection from light section 23a and translucent part 23b band-like as replace with the light reflex film 22 and show in the optical diffusion shell, a half mirror, and drawing 3 as other quantity of light reduction means continue may be use.

Moreover, although the quantity of light reduction means is formed in the fluorescence tubing 20 at one, it may form in base 16a of a slot 16 directly, or you may make it infix the member in which the light reflex film 22 was formed between a slot 16 and the fluorescence tubing 20, in the 1st and 2nd above mentioned example.

[0017]

Drawing 4 is drawing of longitudinal section of the lighting system which is other 3rd example of this design. Although said 1st example was a lighting system for liquid crystal displays, this 2nd example is applied to the lighting implement used attaching in head lining, a wall, etc. As for a different point from said 1st example, the light reflex film is not formed at the fluorescence tubing 20, but incidence of the light which goes ahead from the fluorescence tubing 20 is carried out to a light guide plate 12, without being reflected. The reflecting prism 14 for reflecting in the front face of the light guide plate corresponding to the slot 16 for fluorescence tubing arrangement a part of light which carried out incidence to the light guide plate 12 from groove bottom side 16a is formed. It is that the reflecting plate 30 which reflects positively the light reflected with the reflecting prism 14 ahead [ vertical direction ] is formed in the opening side of a slot 16.

[0018]

For a reflecting prism 14, as a light guide plate 12 is made into the transparent product made of polycarbonate resin an

it is shown in drawing 5, \*\*\*\* of 45 degrees 14a is 0 to the front face of a light guide plate 12. Continuation formation was carried out with the fluorescence tubing arrangement direction in 35mm pitch at parallel, and it is constituted by the same slot as the slot of the precision prism currently formed in the reflective film called the trade name "SOLF" shown in drawing 6. This "SOLF" makes a part of light penetrate by the size of a critical angle in a prism forming face, carries out outgoing radiation as a parallel light, reflects a part of light, and has the property to reflect all the light that carried out incidence from the smooth side side with the tilt angle of 27.6 right and left to the extension direction of a prism slot. That is, in "SOLF", as shown in drawing 6, light L1 carries out incidence into a film from P1 point on the smooth side a, and reflects light on the surface of prism in P2 point. Furthermore, in P3 point, it reflects on other front faces of prism, and outgoing radiation of the light is carried out from a film as a light L2 through the point P4 on the smooth side a. In the reflecting prism 14 which consists of a prism slot of this "SOLF", and same prism slot, since the great portion of light which carried out incidence to the light guide plate 12 through base 16a of a slot from the fluorescence tubing 20 is reflected, also in this example, the optical nonuniformity that only the field of the center of the vertical direction corresponding to the fluorescence tubing 20 becomes bright is lost like said 1st example. In addition, the cross section of a slot 16 is used as the U character mold, and wearing of the fluorescence tubing 20 from the tooth-back side of a light guide plate 12 is possible for it.

[0019]

Moreover, in the front face of the prism lens 26, it replaces with the liquid crystal display panel 28 of said example, and the point that the protection-from-light frame 40 by which continuation formation was carried out is attached is also different in the vertical direction for the band-like slit 42 prolonged right and left. It has the structure which is [ as opposed to / although the fluorescence from the transverse-plane location which carries out a right pair to a lighting implement as it is shown in E2, since make only the light which advances in the direction which carries out an abbreviation rectangular cross with the extension direction of only the light 40 in which this protection-from-light frame 40 can penetrate a slit 42, i.e., a protection-from-light frame, penetrate and directivity is giving the transmitted light is in sight, as it is shown in E1 / a lighting implement ] not seen at all. Others are the same as that of said 1st example, and the explanation is omitted by attaching the same sign.

In addition, although the reflecting prism 14 is formed in the front face of a light guide plate 12 in said 3rd example at one, you may be the structure which stuck "SOLF" which has an operation of a reflecting prism in the location corresponding to fluorescence tubing on a light guide plate 12.

[0020]

Drawing 7 is drawing of longitudinal section of the lighting system which is the 4th example of this design. In this example, continuation formation of the hexagon-head drill type prism stipple 15 as shown in drawing 8 throughout the front face of a light guide plate 12 is carried out instead of preparing a prism lens. For this reason, it will be reflected if an incident angle is larger than a critical angle in the prism stipple 15, and if the light in a light guide plate 12 is smaller than a critical angle, it will become abbreviation parallel light and outgoing radiation of it will be carried out ahead. Although the prism step 27 shown in said example has the operation which makes outgoing radiation light abbreviation parallel to the vertical direction, there is no operation which makes outgoing radiation light abbreviation parallel to a longitudinal direction. However, since this prism stipple 15 has the operation which makes outgoing radiation light abbreviation parallel to the vertical direction and a longitudinal direction, the light adjusted also to the longitudinal direction by parallel is led to the whole luminescence side of the optical diffusion plate 24. That is, since the prism stipple 15 currently formed in the front face of a light guide plate 12 acts as a prism lens, there are so few component part mark of a lighting fixture, and structure is brief. In addition, the prism stipple 15 may be others, a cone (refer to drawing 9), rectangular-head drill type, etc. [ type / hexagon-head drill ]

[0021]

In addition, it may replace with the prism lens 26 in the 1-3rd above mentioned examples, and the prism stipple lens with which prism stipple was formed in the rear face may be used.

[0022]

[Effect of the Device]

Since according to the lighting system concerning claim 1 the quantity of light reduction means formed in the stipple light guide plate reduces the outgoing radiation quantity of light from the field corresponding to fluorescence tubing of light guide plate and corrects the excess [ / near the fluorescence tubing ] of the quantity of light while luminescence of fluorescence tubing makes the whole prism lens emit light through a stipple light guide plate so that clearly from the above explanation, there is also no stray light, the whole prism lens emits light to homogeneity, and a lighting system with good visibility is obtained.

[0023]

In claim 2, since it is reflected by the reflector member which is the quantity of light reduction means established between a groove bottom side and fluorescence tubing and the light which goes to the groove bottom side side of a light guide plate dims by it from fluorescence tubing, the whole prism lens emits light to homogeneity, and a lighting system with good visibility is obtained.

In claim 3, since a part reflects and dims the light which carried out incidence to the light guide plate through the groove bottom side from fluorescence tubing with the reflecting prism formed in the front face of an after [ incidence ] light guide plate, the whole prism lens emits light to homogeneity, and a lighting system with good visibility is obtained.

[0024]

In claim 4, since the outgoing radiation quantity of light from the field corresponding to fluorescence tubing dims luminescence of fluorescence tubing by the reflector member which is the quantity of light reduction means established between a groove bottom side and fluorescence tubing while it makes the whole stipple light guide plate with which stipple was given to the rear face and prism stipple was given to the front face emit light, the whole stipple light guide plate emits light to homogeneity, and a lighting system with good visibility is obtained.

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[Translation done.]

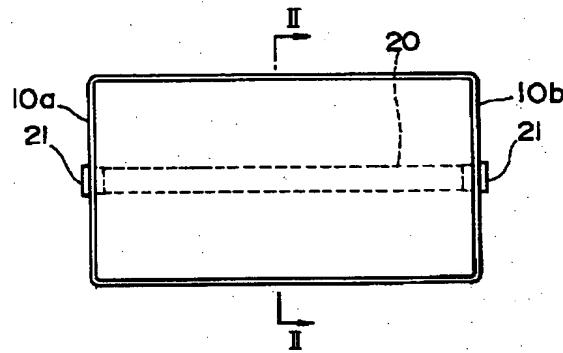
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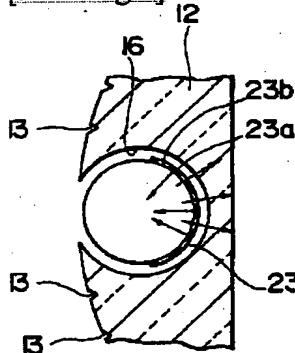
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## DRAWINGS

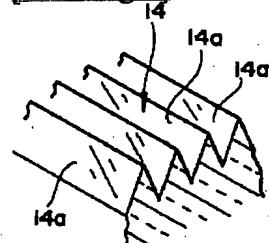
## [Drawing 1]



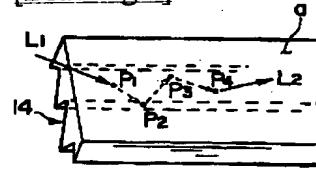
## [Drawing 3]



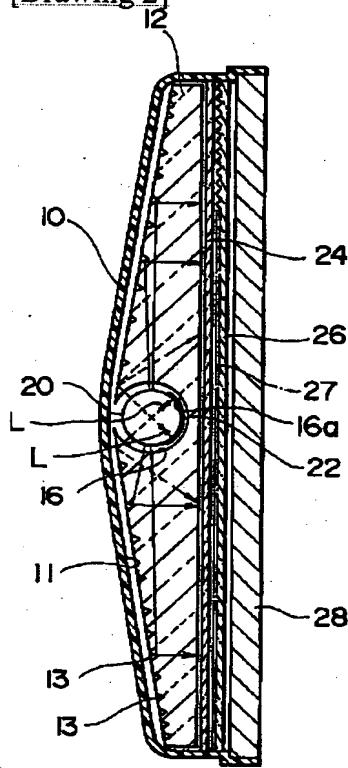
## [Drawing 5]



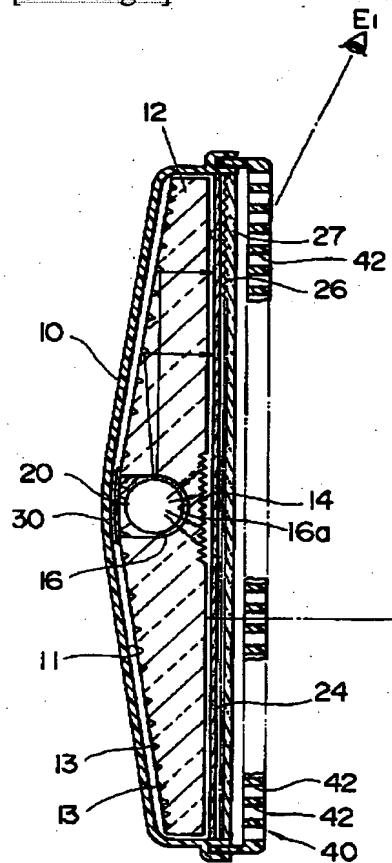
## [Drawing 6]



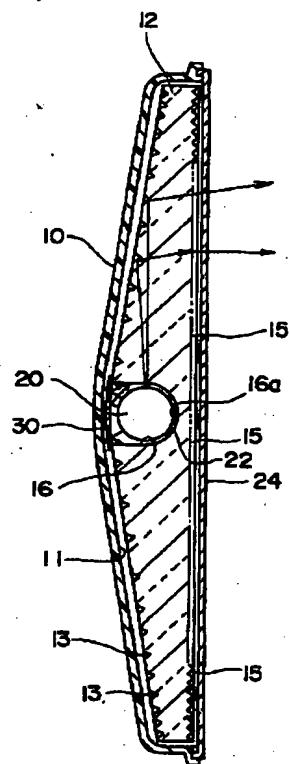
[Drawing 2]



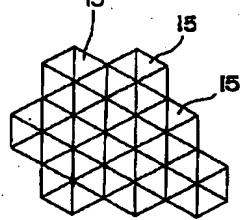
[Drawing 4]



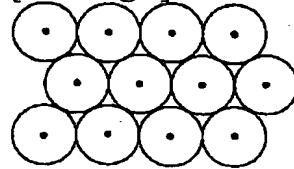
[Drawing 7]



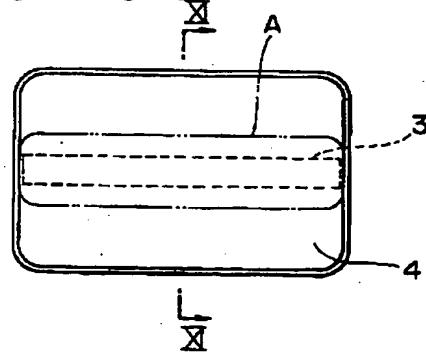
[Drawing 8]



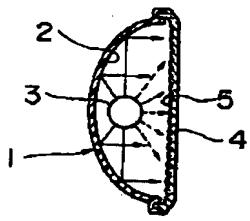
[Drawing 9]



[Drawing 10]



[Drawing 11]



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[Translation done.]